

CLAIMS

What is claimed is:

1. A final product primarily of a PET matrix composition of recycled materials, said PET matrix composition consisting essentially of a micro cellular closed cell composite with discontinuous voids, said PET matrix composition comprising:
polyethylene terephthalate (PET); and
elastomeric material.
2. A final product in accordance with claim 1 wherein said PET comprises recycled plastic bottles comprising PET.
3. A final product accordance with claim 1 wherein said elastomeric material comprises recycled tires.
4. A final product in accordance with claim 3 wherein said elastomeric material further comprises ethylene-propylene-diene monomer (EPDM) selected from the group consisting of: wiper blades and door gaskets.
5. A final product in accordance with claim 1 wherein said elastomeric material comprises at least one elastomeric selected from the group consisting of: styrene-butadiene, polybutadiene, polyisoprene, and natural rubber.
6. A composition in accordance with claim 1 further comprising polyolefins selected from the group consisting of polyethylene and polypropylene.
7. A composition in accordance with claim 6 wherein said polyolefins comprise recycled products selected from the group consisting of: bottle-base cups, bottle caps, labels, milk jugs, garbage bags, scrap sheeting, plastic bottles, and plastic toys.

8. A composition in accordance with claim 1 including at least one additive selected from the group consisting of: a foaming agent, compatibilizer agent, chain extending agent, hydrolytic resistance agent, and filler.

9. A final product in accordance with claim 1 selected from the group consisting of: a docking post, telephone pole, dock support, deck, boat slip, pier, stake, shovel, rake, ax handle, hammer, handles, shingle, baseball bat, and cricket bat.

10. A final foamed product selected from the group consisting of a micro cellular closed cell composite with discontinuous voids, an open cell composite with semi-continuous voids, and combinations thereof, said foamed product having a composition, comprising by weight:

from about 5% to about 95% polyethylene terephthalate (PET) with an inherent viscosity (I.V.) from about 0.4 to about 0.9; and

from about 5% to about 50% elastomeric-containing material selected from the group consisting of styrene-butadiene, polybutadiene, polyisoprene, and natural rubber.

11. A foamed final product having a composition in accordance with claim 10 comprising by weight:

from about 20% to about 80% PET with an inherent viscosity from about 0.5 to about 0.8; and

from about 10% to about 45% elastomeric-containing material with a density from about 0.9 to about 0.96 g/cc.

12. A foamed final product having a composition in accordance with claim 10 comprising:

from about 30% to about 60% PET with an inherent viscosity from about 0.6 to about 0.7; and

from about 20% to about 40% elastomeric-containing material.

13. A composition in accordance with claim 10 including at least one foaming agent selected from the group consisting of: carbon dioxide, nitrogen, argon, cyclopentane, and a fluorocarbon partially substituted with chlorine, bromine, or iodine.

14. A composition in accordance with claim 10 comprising by weight:
from about 0% to about 25% polyolefin selected from the group consisting of polyethylene and polypropylene;

a compatibilizing agent comprising at least one binder selected from the group consisting of about 0% to about 6% Hytel-type binder comprising thermoplastic polyester elastomer of polybutylene terephthalate (PBT) and polytetrahydrofuran glycol, from about 0% to about 3% maleated polyolefin binder selected from the group consisting of polyethylene and polypropylene, and from about 0% to about 1% polyester elastomer binder comprising polybutadienediol (PDS);

from about 0.05% to about 2% of a branching agent providing a chain extending agent selected from the group consisting of pyromellitic dianhydride, trimellitic anhydride, benzophenonetetracarboxylic acid dianhydride, sulfonyldipthalic acid dianhydride, 2, 2-bis (2-oxazoline), and pentaerythritol;

from about 0% to about 3% hydrolytic resistance agent selected from the group consisting of 2, 2'-bis (2-oxazoline), poly (1, 3, 5-triisopropylphenylene-2, 4-carbodiimide, N, N'-bis (2, 6-disopropylphenyl) carbodiimide, and 2, 6, 2', 6'-tetraisopropylidene carbodiimide; and

from about 0% to about 30% filler comprising additives selected from the group consisting of talc, silica, colorant, glass fibers, carbon black, and calcium carbonate.

15. A composition in accordance with claim 14 comprising by weight:
from about 0% to about 15% polyolefin;
a compatibilizing agent comprising at least one binder selected from the group consisting of about 1% to about 5% Hytel-type binder, from about 1% to about 2% maleated polyolefin binder, and from about 0.1% to about 0.8% polyester elastomer binder;
from about 0.2% to about 1% branching agent;
from about 0.2% to about 2% hydrolytic resistance agent; and
from about 0% to about 25% filler.

16. A composition in accordance with claim 14 comprising by weight:
from about 0% to about 5% polyolefin;
a compatibilizing agent comprising at least one binder selected from the group consisting of about 2% to about 4% Hytel-type binder, from about 0.5% to about 1.5% maleated polyolefin binder, and from about 0.3% to about 0.6% polyester elastomer binder;
from about 0.3% to about 0.6% branching agent;
from about 0.5% to about 1% hydrolytic resistance agent; and
from about 0% to about 20% filler.
17. A composition in accordance with claim 14 wherein said polyolefins comprise recycled products selected from the group consisting of: bottle-base cups, bottle caps, labels, milk jugs, garbage bags, scrap sheeting, plastic bottles, and plastic toys.
18. A foamed final product having a composition in accordance with claim 10 wherein:
said PET comprises recycled PET bottles; and
said elastomeric-containing material comprises granulated or pulverized recycled tires.
19. A foamed final product having a composition in accordance with claim 18 further comprising ethylene-propylene-diene monomer (EPDM) selected from the group consisting of vehicle wiper blades, door gaskets, vehicle seals, and refrigerator seals.
20. A foamed final product having a selected from the group consisting of: a railroad tie, post, beam, strut, plank, pole, dock support, deck, boat slip, pier, stake, shovel, rake, ax handle, hammer, handle, shingle, baseball bat, and cricket bat.
21. A final product in accordance with claim 1 comprising a foamed railroad tie.